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THE NEW SCIENCE IN RELATION TO THEISM.

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UNTIL recent years the prevailing theory of scientific materialism regarded matter and its physical forces (summed up in the word "motion") as a complete explanation of the universe. Mind, they said, is not a substance, but a function of matter. Thought is produced by the nervous system, organized as brain, somewhat as bile is secreted by the liver or as the motion of our arm is caused by the contraction of a muscle.

In support of this theory several courses of argument were brought forward. First, the forces at work in the human frame are found to obey the same laws with those in outer nature. Likewise the origin of them is traced to purely material facts, namely the food, drink, and air, whatever we take into our body. Moreover, these forces make use of familiar mechanical contrivances. Just as in a factory the burning coal under the boiler furnishes heat which through the agency of the engine becomes the driving power of a series of machines, so food and drink and air in man furnish all the power that carries on the various functions of the several organs of our body. This power operates the stomach to prepare more fuel, and the lungs as a bellows to get oxygen to burn it, and the heart as a force pump to carry supplies to every part and bring back the blood loaded with refuse which it has picked up in its course, and finally operates certain filters to strain off the waste. This process is being repeated so long as we live. On the whole, man is correctly described as a mechanical contrivance uniting many ingenious devices.

Still again, the forces in us are now weighed and measured with the exact scales of science. We have a definite quantity in store, not the same in all, but differing with each one. We draw off something from this amount and make it less by every movement of the body and every mental act. The scientist can tell you how much blood is used up in ordinary thought and feeling, and how much more is required for anxious thought and for great pain or sorrow. He can describe to you what goes on when we have thoughts and feelings. Thus he says: "At the ends of the nerves are certain very delicate escapements so fine that a vision in the eye, or a sound or feeling or thought, may operate them. The vision does not furnish the acting power; it simply finds it in store and turns the stop cock to let it out through one nerve or another." Thus: "When a coward sees his enemy, the sight opens the end of every nerve leading to a most wonderful and complicated device for running, and the whole energy of the man crowds out through those nerves until his strength is exhausted." This is literally true, it is no figure of speech; and the device is purely mechanical, there is no magic about it. To be sure, our running-machine has no wheels and shafts and belts, but it has various other material devices more like an electrical apparatus. Or again: "There is a lack of water in the system, and some nerves are peculiarly affected thereby—we commonly call the peculiarity thirst—but, in fact, these nerves operate certain processes, by which power is let into certain other nerves, which move certain muscles, by which we are walked off to the town pump and get a drink."

These are samples of human actions scientifically explained or described. According to the older materialism, they are fair samples, and no other kinds of action are found in man.

Other fields of inquiry are said to yield the same general result. The revelations of the microscope furnish a full description of the origin of living bodies, and at the same time disclose the source and growth of their organic functions. The scientist has seen practically the whole process. He knows that every living body has arisen from a single cell, of which he can give you a lengthy description. Especially he can tell what the cell does, how it absorbs other material in its neigborhood and, instead of swelling up and bursting, it divides and forms two cells, and they, working individually and together, form other cells. At length these little bodies, form a joint-stock company and divide the labors of the firm. One, for instance, keeps the business of multiplying cells, that the firm may become still larger. Another devotes itself to getting food, and, joining with others (as committee on supplies), forms a stomach. Others, making similar combinations, develop the several organs of the body, each of its kind. By increasing and correlating these committees the body is completed in form and function and grows to its maturity. The process, I repeat, is exactly known; it is seen to be purely mechanical, merely the moving of matter from one place to another. Matter and motion are the whole body; they are its only constituents; they fully explain it.

They also explain all that occurs in it; the mind is not overlooked. While the body is being developed from the single cell through countless stages of increasing complexity into the completed human organism, a soul is being developed in corresponding stages. At first the mental part is merely the simple motions of the cell and its particles. These activities may be called the cell-soul. When the cell combines with another, and again with many, their several motions are of course compounded according to mathematical or mechanical laws. Thus with each multiplication and combination of cells the cell-souls are mingled and elaborated in corresponding complexity and refinement, until at length the human brain and its soul have come forth together.

Now, just as the rude motions of the cell are the functions of the matter of the cell, so the finer and more complex activities are the functions of the matter to which they belong, grade for grade. Of course, the lower organizations cannot do the work of the higher, but with each elaboration matter has a finer and higher function. To be more definite, a number of atoms of carbon in certain conditions will arrange themselves as a crystal of diamond. But let this stone be ground to dust, and the same particles in connection with protoplasm will form living cells and become, say, a tree and its fruit. Then, if a bird eat the fruit, the same matter will enter into its more advanced structure and will manifest a new set of attributes or exert a new set of powers such as the bird has. And, finally, if a man eat the bird, still another advance is made. Thus the same identical particles manifest under different circumstances all these different powers. The same few atoms of carbon will shine in the crystal, and grow in the tree, and fly and sing in the bird, and think in the man. There is no occasion to suppose a separate thinking substance (called the soul) in man, any more than there is for a separate walking substance (a walking-soul) or a digesting-soul, or a separate singing-soul, or in the tree a growing-soul, or in the mineral a crystallizing-soul and a shining-soul. All suggestions of this kind are equally gratuitous and vain, and are emphatically rejected.

For these reasons and the like, it has been held that thought is merely a mechanical product of nerve action; there is no psychosis without neurosis; mind is a function of matter.

When this theory was further applied, it was not found to be quite satisfactory. Long ago those philosophically inclined had viewed with suspicion our notions of matter. They had inquired what it is in itself. Some of them had discovered that we know nothing of it except that it has power to produce certain effects on our senses. It is, indeed, only a mode of force. We did not need to say all things are explained by matter and force, but by force only—or, since force is a mode of motion, by motion only.

Some inquired again, and more exactly still: What do we know about matter and motion and force? and perceived that what we know is merely our knowledge of them; we know only our thoughts; things are just what we think them to be, no more no less. And we can never get outside the mind to see if there be anything but thoughts after all; that is to say, matter is only a certain manner or mode of our thoughts. Matter is a function of mind, and not mind a function of matter.

This turned the tables on the materialist; but for the common man it was a difficult and rather dazing line of thought, in which he could have little confidence. And for the ordinary scientist, accustomed to the vivid realities of his senses rather than to abstract thought, it could not be much more satisfactory. The chief scientists, however, were able to see that materialism was totally overthrown. Matter and motion could not possibly explain the world. "Mechanicalism cannot even explain matter," said Karl Pearson. All parties agreed that at least the old-fashioned confidence in materialism was not justified. For instance, Professor Ferrier had said:

> Matter is already in the field, is an acknowledged fact by all parties; and mind considered as an independent reality is not so unmistakably in the field. Now, since, by a well-known law, entities must not be multiplied without necessity, we are not entitled to postulate a new cause (mind) so long as it is possible to account for phenomena by a cause already in existence.

This reasoning was adopted by many, but when Berkeley's and Kant's acute analysis of our notions of matter had been recalled and enforced by later writers, the judgment of Professor Ferrier was for the more thoughtful quite reversed. No longer can we postulate matter as the one sure thing to build on, for mind antedates it and has the right of way among theories. As I said, however, this thought was for some people difficult. Things of another order were more significant to them, if not to all; as when someone described a Bethoven string quartet as "a scraping of horses' tails on cats' bowels"—a description which, however exact in science, leaves some facts unaccounted for.

Several portions of scientific theory did not well sustain examination. There was Spencer's brilliant generalization by which he defined life. Attractive as it was in its newness and boldness, and having a certain compelling power by virtue of its authority and the number of facts which it gathered in itself, yet it gradually failed to command assent. Spencer had said: "Life in all its manifestations, inclusive of intelligence in its highest forms, consists in the continuous adjustment of internal relations to external relations."[1] But someone remarked that according to this definition the locomotive engine is alive, for its "internal relations are adjusted to its external relations." This seemed to reduce the definition to an absurdity. Yet some thought not, and accepted the idea with its implications. Professor Büchner did not hesitate in his most celebrated book to say: "The steam engine is in a certain sense endowed with life."[2]

Nor can this idea be regarded as merely scholastic and far-

[1] *First Principles* (edition of 1896), p. 87.

[2] *Force and Matter*, p. 136.

fetched. The "untaught child of nature" was found to have a similar view.

> A Matabele scout once ventured over toward a railroad which had been laid near his country, and saw a train starting from the station. He fled to his people and reported he had seen a huge animal belonging to the white man. "It has only one eye," he said; "its breathing can be heard for miles; it can pull many wagons; but before it begins to work it screams with a terrible voice."

In spite of these authorities, however, many have had a more or less conscious feeling that something is lacking in a notion of life when an engine can be called "alive."

There was also a popular suspicion, to say the least, that some of the elements of human experience cannot be derived from matter-forces, and therefore cannot be explained by materialism. In varying phrase, this came to be an opinion or conviction among thoughtful scientists and philosophers. Herbert Spencer[3] himself, though he believed he had "proved inductively and deductively the correlation and translation of physical and mental forces," yet added: "How the metamorphosis takes place, how a force existing as motion, heat, or light can become a mode of consciousness, it is impossible to fathom."

A similar conclusion was reached in the study of the origins of life from the cell. Professor Weismann, a thoroughgoing materialist (as words are used), was yet candid enough to recognize the defects of his own system of thought. He wrote substantially as follows: Every reproductive cell is faithful to its kind, and contains in itself the power to reproduce every important peculiarity of the parent body from which it came. Now, that this cell of only microscopic size should contain from the first as many molecules as there are varieties of structure in the mature organism which it will produce, and besides some special arrangement for faithfully preserving each of those characteristics by which man is distinguished from the brute, and those by which one race of man is different from another, and those finer peculiarities by which one family of man is different from other families for some generations back, and at last those still finer by which the individual is different from all other individuals—that a single microscopic cell should contain something physical corresponding to all these items, each one with power to perpetuate its kind, is so unthinkable

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[3] *First Principles* (edition of Appleton, 1900), pp. 221-31.

> that we are compelled to suspend all known physical and physiological conceptions, and must make the entirely gratuitous assumption of an affinity . . . . whose origin and means of control remain perfectly unintelligible. . . . . An unknown controlling force must be added . . . . in order to marshal the molecules which enter the reproductive cell in such a manner

that they may do their several tasks.[4] Here is a definite declaration that materialism is a failure, and that some extra affinity or unknown force must be supposed to be at work in things living.

It was evident that a more searching study must be made of the whole subject of the relation of the mind and body. Already Descartes and others had compared matter-things and mind-things, and had shown that they are wholly different. Matter and mind have no real resemblance whatsoever. Matter has color, weight, shape, size, and so on. But mind has none of these. Not one thing that you can say of matter (essentially) can be said of mind, with the same meaning. They are so utterly opposite, unlike, and unrelated that we cannot connect them in thought; we cannot imagine their having to do with each other. Spencer declared this relation to be absolutely inscrutable. Huxley and others said it is an inextricable puzzle. Du Bois-Reymond said consciousness cannot be explained by its material conditions. Tyndall in an oft-quoted essay said :

> The formation of crystal, plant, and animal is purely mechanical . . . . but associated with mechanism are phenomena no less certain than those of physics, but between which and mechanism we can discern no necessary connection. The relation of physics and consciousness is invariable, and from a given state of brain the corresponding thought may be inferred—inferred because associated—what relation exists between them we do not know. The passage from the physics of the brain to the corresponding facts of consciousness is unthinkable. Granted that a definite thought and a definite molecular action in the brain occur simultaneously; we do not possess the intellectual organ, nor apparently the rudiment of the organ, which would enable us to

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[4] *Essays on Heredity*, etc. (Oxford, 1891), Vol. I, p. 77.

> pass by a process of reasoning from one to the other. They occur together, we know not why.[5]

In the words of Spencer, again:

> That a unit of feeling has nothing in common with a unit of motion becomes more than ever manifest when we bring them into juxtaposition. No effort enables us to assimilate them.[6]

The agnostic conclusion which these men express was confirmed and made more pointed by another course of thought. It was observed that our idea of cause and effect involves the transfer of energy, or of matter-motion, from the thing called cause to the thing called effect. Now, when thought occurs there is a transfer, but it is from one cell or nerve to another, which other is therefore the effect. There is no transfer of matter-motion into thought: thought is not an effect of matter or its activities, but merely an accompaniment of the effect.

Scientists are fully persuaded that the circle of matter-forces in the order of cause and effect is unbroken: no thought ever enters into that circle as a link between any two parts. The impossibility of such entrance was expressed by Professor Clifford. "Imagine," he says, "a train of cars joined together, not by links of iron, but by bonds of friendship between the engineer and the conductor." No, matter-things and mind-things do not mix. Matter-things within the human body are connected causally, as everywhere else, and all our activities are "fully accounted for in physical science." But that in connection with some of these activities, namely those in certain parts of the brain, there should be thoughts and feelings is entirely unaccounted for; it seems to be something miraculous, "like the appearance of the Djinn when Aladdin rubbed his lamp," says Huxley. Tyndall said:

> I do not think that he [the materialist] is entitled to say that his molecular groupings and his molecular motions explain everything. In reality they explain nothing. The utmost that he can affirm is the association of two classes of phenomena of whose real bond of union he is in absolute ignorance. The problem of the connection of body and soul is as insoluble in its modern form as it was in prehistoric ages.

Karl Vogt's (or Cabanis's) celebrated phrase by which thought is compared with organic secretions and physical activities cannot now be defended. Höffding remarks that some continue to speak (carelessly) of thought as a function of nerves. But, he says, *function* is here misapplied; its real meaning connotes a material product, but thought is not material.[7] Likewise Professor James condemns the notion of the earlier materialism:

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[5] *Fragments of Science*, pp. 119-21.

[6] *Psychology*, Vol. I, p. 158.

> We know of nothing connected with liver and kidney activity which can be in the remotest degree compared with the stream of thought that accompanies the brain's material secretions.[8]

Wundt is not less clear and confident. In *Human and Animal Psychology*[9] he says:

> Cerebral processes give us no shadow of indication as to how our mental life comes into being. For the two series of phenomena are not comparable. We can conceive how one motion may be transformed into another, perhaps also how one sensation or feeling is transformed into a second. But no system of cosmic mechanics can make plain to us how a motion can pass over into a sensation or a feeling.

On another page he suggests that "we have made too much of the idea of causality," as if we must be content to find some things uncaused. Clifford thought he found traces of chance in the order of nature. Professor Royce declares:

> There is something more fundamental than Causality, namely, Being, Meaning, Idea. Causality is a distinctly lower grade of fact and is a portion of or subdivision of Meaning.[10]

Perhaps Joseph Le Conte presents this thought most clearly in Royce's *Conception of God:*

> Suppose I could remove the brain-cap of one of you, and expose the brain in active work. . . . . Suppose I could see everything that goes on there, what should I see? Only decompositions and recompositions, molecular agitations and vibrations; in a word, *physical* phenomena, and nothing else. . . . . But you, the subject of this experiment, what do you perceive? You see nothing of this which I see, but an entirely different set of phenomena, namely consciousness, thought, emotion, will, *psychical* phenomena, a self, a person. From the *outside* we see only physical, from the *inside* only psychical phenomena. Now take external nature, the cosmos, instead of the brain. The

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[7] *Outlines of Psychology* (Macmillan, 1893), pp. 60, 61, etc.

[8] *Psychology* (smaller edition; Henry Holt & Co., 1892), p. 133.

[9] Macmillan's edition, 1894, pp. 6, 427.

[10] *World and Individual*, Vol. I, p. 443.

observer from the outside, the ordinary "scientist," sees and *can* see only physical phenomena. But this may not be the case on the other side.[11]

Many others, including Dr. Paulsen especially, have shown that no just conception of nature can overlook the "meaning" of it, and that the meaning is something not in the order of cause and effect, as physical science knows them. This mental element, this "real value" of things, is to be excluded from our notions of *cause* and *physics*, and therefore from *function*, as it must be understood in this connection.

In short, science now forbids us to say that matter is the cause of mind or of anything in mind. Exact science denies that thought is a function of matter.

The preceding statements are mostly negative and barren, but they imply a positive value, which scientists have not overlooked. When Weismann felt himself obliged to "assume an unknown controlling force" in the production of living forms, he had given more than a bare suggestion that the force is immaterial, for he described it as entirely unlike the known material forces in both origin and method of action, yet as also able to arrange and adapt material things to the definite service of life and mind. It is fair, however, to add that Weismann intended his words to be agnostic—whatever value you and I may see in them.

A more positive conviction was reached by the philosophers who had turned the tables on the materialists and found that mind rather than matter is at the bottom of all things. Spencer, while fully recognizing the difficulties of the question, declared that, if we were compelled to choose between the physical origin of all things and the mental origin, we must choose the latter.[12] Still later, the same author in a private letter "saw no escape from the conclusion that when life first arose on earth, a new force came into play."[13] Practically all the philosophers from Plato to Paulsen, Deussen, and Royce have agreed that the source of all things is either mind or some mind-like thing, such

[11] Original edition, p. 43.

[12] *Psychology*, Vol. I, pp. 160, 161.

[13] PROFESSOR JAPP, before British Association for Advance of Science, September, 1898. See *Independent*, December 1, 1898, p. 1564.

as will, impulse, effort, or idea. Among broad-minded scientists and critics there is a tendency to the same thought. Huxley said that, as a matter of fact, we know more about mind than we do about body. The immaterial world is a firmer reality than the material. Professor Clifford went so far as to say that the world is made of mind-stuff. Professor Karl Pearson suggests that after analyzing the scientific concept of matter, the only thing that we can find that at all resembles it is mind.[14]

Thus the vivid sense of the real unlikeness of mind and matter, and the reaction from gross materialism, have resulted in the total overthrow of the theory that the soul is derived from purely material beginnings, from mere motion in matter. Science has, therefore, been obliged to substitute another theory, namely, that the soul is derived from some *mind-germ*—an eternal something-else-than-matter, which is always present with matter, though in various stages of development. Here is one form of the idea of the "associated thought," the "view from the inside," the "meaning" of which the wise have spoken.

The evidences of this mind-germ are both deductive and inductive. An example of the first is the *a priori* necessity of supposing a peculiar and distinctive source, in order to explain the growth of mind. The inductive evidences are summed up in the mind-like actions which are observed in matter, even in its lowest estate. Essentially, this is no new theory, but can be found in ancient times; and in later centuries it has had advocates such as Gassendi and Lamarck. Perhaps its largest expression is given by Paulsen, who quotes a great array of authorities. Some additional expressions may exhibit its variations of form. Thomas A. Edison was recently quoted as saying that

> No one can study chemistry and see the wonderful way in which certain elements combine with the nicety of the most delicate machine, and not come to the inevitable conclusion that there is a master intelligence controlling them.

Some go farther and declare that not only are the movements of matter *directed* by intelligence, but that they *are* the movements of mind. Haeckel himself applies the language of mind to the fundamental activities of matter, as, for instance, when he identifies chemical affinity and repulsion with love and hate. So, indeed, Du Bois-Reymond, and all his kind, have identified matter-activities with mind-activities, when they declare there are no new forces in life and mind or thought, but merely the same old forces with which we are familiar in matter and mechanics at large.

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[14] *Ethic of Free Thought*, 2d ed., p. 22; *cf.* p. 32.

John Fiske said:

> The law of evolution . . . . means that the universe as a whole is thrilling in every fiber with life — not indeed life in its usual restricted sense, but life in a general sense. The distinction, once deemed absolute, between the living and the not living, is converted into a relative distinction. Life as manifested in the organism is only a specialized form of the Universal Life.

In the words of Professor James:

> If evolution is to work smoothly, consciousness must have been present at the very origin of things. Accordingly the more clear-sighted evolutionary philosophers are begining to posit it there.

It is to the thought in which these several statements agree that I would call attention. These authorities mean to say that all matter has in it (or in some connection with it) life and intelligence, or mind. The import of this scientific conclusion is the chief topic of the present essay. By this conclusion we are required to think of life as having almost infinite variety of form and grade, and mind as likewise graded and differing with every device through which it is manifested, and having an endless series of means of expression. With the help of science we will be more definite, and for brevity may confine attention mostly to mind, as for our purpose sufficiently inclusive of life. A portion of its significance may be seen by taking another look at the approaches by which scientists have reached their position. From the study of the signs of mind in man they have moved to the study of animals next below man; and have been unable to find any dividing line between them. If one has mind, the other has, although it is of a somewhat different kind. Then they have studied the next lower animals, and have found again no dividing line. And so on to the bottom. At no point is there a possibility of saying: Above this there is mind and below this no mind. In fact, there is mind all the way down and all the way up, from the single protozoic cell to the complex human brain. A multitude of facts point to this conception. Professor Cope finds that the cells which in the human brain do the thinking are the same kind as the protozoic cells from which all life has arisen or by whose work we are what we are. If they think in man and in animals near his grade, why not in all grades, unto the simplest? Indeed, careful observation of these indicates as much. Single cells in their original uncompounded state appear to have the sense of touch, light, and color, and some other indefinite, perhaps universal, sense. In their spontaneous activities are signs of will, and in the selection or choice of needed material from the blood is a fine intelligence and discrimination—but more of this later.

The scientist, however, has not done with us yet. His theory is more wonderful still. He says our thought cannot stop with cells. If cell-activity is intelligent, then the work of the so-called dead matter in forming the original cell was intelligent; if one activity is intelligent, then the others also. In short, all matter is alive and thinks.

"What," says someone, "this dull, rigid, deadest thing, stones and dirt, alive!" The scientist replies: "Who told you that matter is rigid?" In fact, the hardness and deadness of matter are popular superstitions. Science teaches that all the attributes of matter are modes of motion. And this very hardness is produced by an especially rapid variety of motion. As a top when it spins more rapidly stands up more stiffly, becomes more rigid, so the atoms and molecules which have unthinkably high rates of motion are firmest in their place. If there were really no activity in matter, it would then be dead, but it would then lack all the attributes of firmness and solidity which it now has.

The general course of reasoning at this point is effectively presented by Karl Pearson. He says, in substance: The action of cells in gathering other matter and forming more cells like them is called life. But the action of atoms in collecting other atoms and forming molecules, and of molecules in forming a mass, is just as truly life as the other. And if from your neighbor's intelligent actions you infer that he thinks and is conscious, you must, if consistent, infer that atoms think and are conscious. The world is completely rational. Primarily it is to us a succession of sensations, but when we analyze them we find more than sensations and barren succession; we find a logical sequence. Only the idiot or the madman fails to find order. Tell me, says the great scientist, the nature of matter, and, merely by developing the definition, I will show how the world was made. Tell me the laws of motion, and I will rationally deduce the physical universe. I will shut myself up in my closet and write out certain formulæ in mathematical terms, and draw on paper a chart representing my thoughts. Then I will go forth, and behold, every object of nature fits the formulæ I wrote out of mind and follows the curve I drew with my pencil. The greatest result of human experience, the greatest triumph of the human mind, is the discovery that the laws of the physical universe follow logical processes. The intellect—the human mind—is the keynote to the physical universe.

Very often the scientists have seen and intended the implication of mind; but have said the mind is dull and stupid, mind at the minimum, a mere germinal intelligence. I would suggest, however, that Professor Pearson's words describe no such thing. They speak of the universal mind, they imply mind at its maximum, a supreme intelligence. Let us see: *If the activities of the cell and atom are intelligent, or are substantially identical with mind-activities, or are indications of mind, then they are indications of a mind which is comparable with the character of the activities in evidence.* On the one hand we must consider the fineness of the work done in the microscopic cell, and that done with the atom, beyond any possibility of the microscope, and perhaps we should add the latest supposed subdivision of atoms into several hundred parts. The refinement, sensitiveness, and delicacy of the faculty that can invent and handle these things is so far beyond our coarse and bungling minds as to be out of all comparison.

Consider next the variety of the work done. Stuart Mill used to say that the variety of nature is infinite. And another has said: If there is any one thing the mind of nature seems to like more than another, it is variety. Of all the leaves of the forest there are no duplicates. The mind of nature shows no sign of bondage or the limitations of habit such as small dull minds have, but it elastically fits every occasion, and adapts its activity to every changing circumstance.

Think of the surety and precision of the operations in question! A little mind is weak, whimsical, vacillating, unreliable. But science tells us that everything in nature is orderly, accurate, infallible—so much so that we have been accustomed to think of the activities of nature as not mind at all, but mechanical necessity. If, now, they are mind at all, they are a great, strong, perfect mind.

Think also of the *unthinkable* swiftness of some of these activities! We have a proverb: "Quick as thought." The speed of human thought has been measured, and is reported as about one hundred feet per second. Let this or our ordinary human movements be compared with light at 186,000 miles per second, or with gravity at 186,000,000,000 miles per second—"and nobody knows how much faster." If slow movement indicates dulness, stupidity, and germinal intelligence, what shall be said of the human mind in comparison with that of nature?

Finally, we must reckon with the greatness of the work done, the universal range, of which Mr. Pearson writes, some notion of which we gather with effort from the revelations of astronomy. These also are in evidence, and are as unthinkably great as the first are small.

On the other hand, there are in nature some things which, in our view at least, are dull and slow. Their existence is not for a moment overlooked; and if they were all the facts to be reckoned with, they might signify a germ-mind—and for all I know there are such minds doing such work. But there are the other facts which we have been considering above; no germinal intelligence is adequate to them. To be more definite: A single cell goes to work to make a hen. Science says that in doing so it shows mind or intelligence. Very well. The mind that can make a hen out of a cell is no fool of a mind; it is altogether superior to the hen-mind, or the human mind. And the mind that can do this, and all the rest that must be taken into account, is an unthinkably great mind.

In short, the evidence indicates a mind or intelligence of practically infinite fineness, variety, or adaptability, precision, quickness, and power—in effect, the Infinite Mind of Christian theology.

Another, and very different, line of thought has contributed to the same general result. Many scientists, aware that matter, as commonly known, furnishes no unity or finality as an explanation of the world, have sought and found an underlying substance and cause of all things. They call it "ether," and describe it as essentially different from matter, to the extent of being contrasted in nearly all its attributes. Their words at once suggest its identity with mind, especially when the list of positive properties is considered. Ether is described as without atoms, structure, friction, heat, weight, or other power to affect (directly) our senses, and also as filling all space, of unthinkably quick activities, of infinite energy, indestructible, the source of all that is. Some other attributes are mentioned or supposed to exist, but they need not be included here.

Let me call attention to what has been said in naming these attributes. To "fill all space" is to be omnipresent, to "have infinite energy" is to be omnipotent, to be "indestructible and the source of all" is to be the eternal Creator; and the other properties named are simply familiar attributes of God as conceived by the Christians, expressed in unfamiliar and unhandy terms. The elaboration of the theory is even more suggestive. Hear the cosmology of this mode of thought: Ether is the eternal first cause, which for reasons within itself has created all things and governs them in accordance with the laws of its own nature. Ether is the "mind-stuff" of which the world is made. This one great activity has set up within itself certain lesser and local activities, which live and move and have their being in ether, and which cannot escape from its all-enfolding and pervading power, though they take wings of the morning or make their bed in the grave. Their derived activities are in some degree independent and have spontaneous energies like their parent, and are ever pushing onward, taking on peculiarities of impulse or action-habit according to their varied experiences. Some have become so far developed and so peculiar as to be personal individuals, with rights and duties and dignities of their own. These are called men. So we might go on to describe the world, in large part—translating the well-known Christian doctrine into the rather strange idiom of science.

It can hardly be claimed that the scientist has at last by searching found out God, although Haeckel himself suggested that the "cosmic ether is God;" but it must be regarded as significant that intelligent materialists, starting from their standpoint and proceeding by their methods, have reached a position so very near to theism.

Neither one of the two chief courses of thought which have now been considered gives us the whole idea of the Christian God, though perhaps each gives an essential from which the whole might be inferred, if we were disposed to urge them to the utmost. The total value of the theories may appear in their union. To some extent they are supplementary. Thus, while the ether theory contains no immediate suggestion of a world-pervading intelligence, this element is the chief outcome of the other theory. Only one main element is absent from both of them: the *moral character* of Deity is not brought forward. Yet it is there, if we look beneath the surface; for infinite power and intelligence must know and appreciate moral facts, that is to say, must have moral character.

SUMMARY.

Science joins philosophy in requiring us to give up the old doctrine that matter is the source of all things, and mind is a function of matter. They require us to place chief reliance on mind-things as more firmly real, and to interpret matter-activity as essentially identical with mind, or at least as controlled by mind. But if these activities indicate mind at all, they indicate a mind of practically infinite fineness and greatness. The scientist, in admitting mind into original matter-activities, has in effect abandoned materialism and gone over to theism, with all his baggage and with some very effective weapons of offense and defense. Or, rather, he has become the prophet of modern times, and is promulgating that which makes for religion and theology. In his own words: "Science, so far from having in the popular sense materialized the world, has idealized it, and has for the first time rendered it possible for us to regard it as something intelligible." Professor Wundt says:

> The ideal goal of all science is the coherent theory of the universe, and it is the duty of philosophy to recognize the continuance of mentality in the widest sense beyond experience as given in any science, yet as to the suggestion and completion of every science.

Now has it come to pass that science is doing the work which was foretold for it when Tyndall said:

> To yield the religious sentiment reasonable satisfaction is the problem of problems of this present hour.

Or, in the words of Pearson, again:

> Not to convert the world into a dead mechanism, but to give to humanity in the future a religion worthy its intellect, seems to me the mission which modern science has before it.